

# Erosion Control Breakout



**Breakout Session**

**I-1 Erosion Control**

**Don Lee**

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**Reclamation Sites**

***THE RIGHT WAY***



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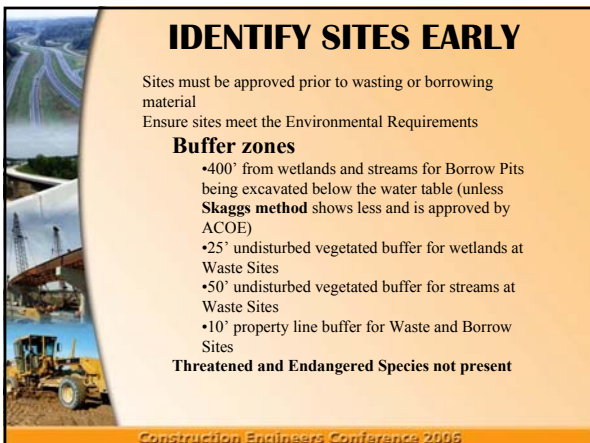
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**IDENTIFY SITES EARLY**

Sites must be approved prior to wasting or borrowing material

Ensure sites meet the Environmental Requirements

**Buffer zones**

- 400' from wetlands and streams for Borrow Pits being excavated below the water table (unless **Skaggs method** shows less and is approved by ACOE)
- 25' undisturbed vegetated buffer for wetlands at Waste Sites
- 50' undisturbed vegetated buffer for streams at Waste Sites
- 10' property line buffer for Waste and Borrow Sites

**Threatened and Endangered Species not present**

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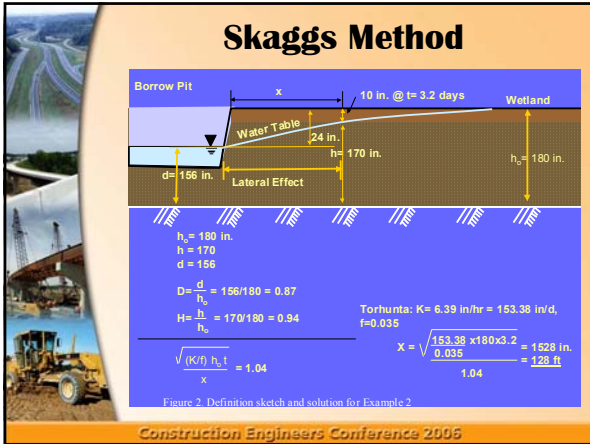
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# Erosion Control Breakout




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**Elements of a Reclamation Plan**

- Reclamation Plan Form - "Narratives"
- Vicinity Map
- Signatures
- Environmental Evaluation
- SHPO Letter for Borrow and Waste Sites
- EC Plan with adequately designed measures
- Seeding specifications
- 1-year post final review

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**Requirements for Commercial Sites**

- Mining Permit Cover page or approval letter which will include the permit number.
- Location map
- Site Plan
- Ensure the commercial site is permitted for the type of waste that is proposed.

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# Erosion Control Breakout

## APPROVAL PROCESS

- Contractor to submit 10 copies of the completed package to the Lead Engineer
- Lead Engineer will review and solicit comments from the DEO and Roadside Environmental Field Ops
- Follow the Checklist - "NO's" should throw up a flag
- Lead Engineer will approve if all requirements of the Reclamation Plan are addressed



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## DURING CONSTRUCTION

- Delineate buffer zones and utilize highly visible fencing.
- Install EC devices along perimeter and along haul roads
- Excavate/Build slopes in a manner which allows for stage seeding of slopes
- Monitor the turbidity of Borrow Pit discharge
- Sites are considered "single source", unless the site has commercial status.

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50' Buffer



Slopes Excavated Properly



Poor Stage Seeding



Vertical Slopes

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# Erosion Control Breakout

## FINAL ACCEPTANCE

- Borrow and Waste Sites must meet all the requirements of the Reclamation Plan.
- Permanent stand of vegetation must cover the entire site.
- Property owner will be notified that the site is complete and that inspections and possible repair work may be required during the coming year.
- Site will be reviewed after 1 year and released if the site is deemed stable.

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## Waiting on Pits to Stabilize?

- Are Final Estimates being held up?
- Should the contractor be held responsible for additional repairs?
- Do we need to look at warranty periods?



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Poor vegetation establishment

Established Vegetation

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## FOR MORE INFORMATION

- Procedures can be found at the Roadside Environmental Field Operations website:
  - INTERACTIVE PDF FORMS



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## In-Depth Erosion Control Audits

- April 1, 2004 - March, 31, 2005
- 57 In-Depth Erosion Control Audits
- In general:
  - Installation was very good
  - Maintenance was good
  - Continuous grading & ground cover needed some attention.

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## In-Depth Erosion Control Audits

### INSTALLATION ISSUES

- Devices Were Installed IAW Erosion Control Plans.
- Overall Installation Scores for Were Very Good.
- Continue to Use the Weekly Erosion Control Lists
- Ensure Devices Comply With the Sediment and Pollution Control Act

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# Erosion Control Breakout



**In-Depth Erosion Control Audits**

INSTALLATION

- Continue to Consistently Use and Enforce the Erosion Control List on a Weekly Basis.

Or

- After Each Major Rain Event and Initiate Corrective Measures As Needed.

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**In-Depth Erosion Control Audits**

- All Changes to Erosion Control Measures Must Be Noted on the Master Plans
  - Initialed or Signed
  - Dated
  - Authorization

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**In-Depth Erosion Control Audits**

Do Not Change These Erosion Control Items

- Type A Silt Basin – (Roadside Environmental Unit Will Consult Hydraulics Unit.)
- Rip Rap Sediment Dams
- Temporary Sediment Trap – Located At Stream Crossings or Drainage Turnouts.
- Rock Silt Check Dam Trap – Located At Stream Crossings Or Drainage Turnouts.
- Culvert Construction Sequence – (Roadside Environmental Unit Will Consult Hydraulics Unit.)
- Channel Changes – Temporary or Permanent (Roadside Environmental Unit Will Consult Hydraulics Unit.)

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# Erosion Control Breakout



## In-Depth Erosion Control Audits

- The Master Set of Erosion Control Plans Must Remain on the Project at All Times
  - Designate a Primary Person to Update and Maintain the Master Set.
  - If This Person Is Away From the Project Designate a Location for These Plans to Be Stored.

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## In-Depth Erosion Control Audits

- Common Problems Encountered Was Installation of Check Dams, Specifically the Weir Section.
  - Weir Section Widths and Elevations Should Correspond to That Detailed in Section 1600 of the Roadway Standard Drawings.
  - The Following Web Location Has Information Related the Proper Check Dam Installation.

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## In-Depth Erosion Control Audits

- Roadside Field Operations Engineers
  - Are a Resource for Conducting Informal Training
- Erosion Control Field Guide:
  - Excellent Training Tool for Visual Representation of Erosion Control Devices.
  - Contact the Roadside Field Operations Engineer for Additional Copies of This Flip Chart Training Booklet.

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# Erosion Control Breakout

## Standard Provision

Following completion of any phase or operation on any graded slope area greater than one acre, the contractor shall provide ground cover sufficient to restrain erosion within 21 calendar days or within a time period specified by the *Sedimentation and Pollution Control Act*. The ground cover shall be either temporary or permanent and the type specified in the contract.

Following completion of any phase or operation on any graded slope area greater than one acre, the contractor shall provide ground cover sufficient to restrain erosion within 21 calendar days or within a time period specified by the *Sedimentation and Pollution Control Act*. The ground cover shall be either temporary or permanent and the type specified in the contract.

Effective October 1, 2005

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## Temp. Mulch To Reduce Erosion

- Bare ground  
0%
- 1 Ton/Ac. Small Grain Straw  
87%
- 2 Tons/Ac. Small Grain Straw  
98%



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## Proper Seedbed Preparation



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# Erosion Control Breakout

## Stage Seeding



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## Disturbed Areas to Final Grade



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## Permanent Seed/Mulch/Tack



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# Erosion Control Breakout



## Matting for Erosion control



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## A Final Product



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## Erosion & Sediment Control / Stormwater Certification

What a Resident Engineer's Office should know

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# Erosion Control Breakout

## Certification

- Program administered by NCSU, Department of Biological & Agricultural Engineering and includes:
  - Classroom Instruction
  - Examination
- Candidates may waive classroom instruction and attend examination only

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## Certification Levels

- Level I: Inspector / Installer (required for each)
  - Seeding / mulching operations
  - Erosion control installation
  - Pipe installation in jurisdictional waters
- Level II: Site Management (required for each)
  - Grading operations
  - Bridge / culvert construction
  - Utility operations
- Level III: Designer
  - E / SC Plan Design

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## Effective Dates

- Certified Level II Site Managers will be required on any TIP project that requires an erosion control plan on projects let on/after January 1, 2006. Prime contractor will name at preconstruction conference.
- Certified Level I Inspectors / Installers will be required on any TIP project that requires an erosion control plan on projects let on/after January 1, 2007.
- Certified Designers- TBA

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# Erosion Control Breakout

## Provisional Certifications

- For a period of one year the NCDOT will honor:
  - **Sister States' Certifications**
    - Tennessee's Level II = NC's Level II
    - Virginia/South Carolina's Level II = NC's Level I
- Registered Engineers are NOT exempt.

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## Revocation of Certification

- Certification may be revoked if the project receives:
  - NOV- Notice of Violation (DENR)
  - C&D- Cease & Desist Order (USACE)
  - Continuing ICA- Continuing Immediate Corrective Action (REU)
- Contractor is responsible for supplying additional certified personnel should certification be revoked.
- Revoked certifications may be renewed by successfully passing the proper certification exam.

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## Re-certification

- Certifications are effective for 3 years.
- Re-certification may be obtained by attending the proper NCDOT / NCSU Re-certification course.

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# Erosion Control Breakout



**Summarizing**

- The project must have a Level II certified site manager on site within 24 hours at all times.
- Grading Operation must have a Level II certified person on site.
- Culvert/Bridge Operation must have a Level II certified person on site.
- Utility Operation must have a Level II certified person on site.
- Seeding and Mulching Operation must have a Level I certified person on site.
- Erosion and Sedimentation Control Device installation must have a Level I certified person on site.
- Pipe installation within jurisdictional area must have a Level I certified person on site.
- Level I and Level II training is independent

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**Additional Information**

- For additional details, visit the Certification website at:
  - [www.bae.ncsu.edu/workshops/dot/](http://www.bae.ncsu.edu/workshops/dot/)
- Ted Sherrod, PE Roadside Environmental Unit
  - (919) 733-2920
  - [tsherrod@dot.state.nc.us](mailto:tsherrod@dot.state.nc.us)

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**Erosion & Sediment Control Design Changes**

**What a Resident Engineer's Office should know**

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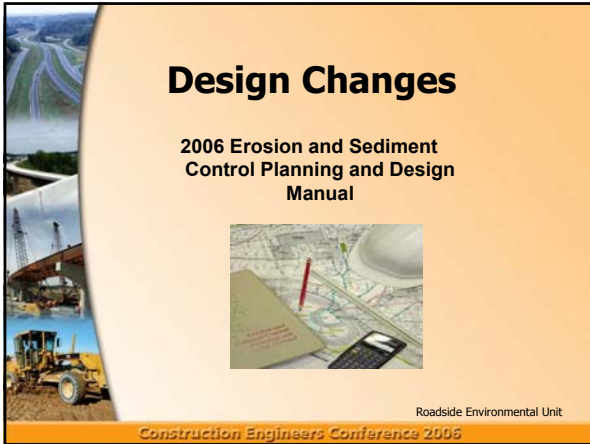
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# Erosion Control Breakout



## Design Changes

2006 Erosion and Sediment Control Planning and Design Manual



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## Design Changes

### Old Design Criteria

- 1800 Cubic Feet / Disturbed Acre



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## Design Changes

### 2006 Design Criteria

- Surface Area Requirement
- 3600 Cubic Feet / Disturbed Area
- High Efficiency Outlet Control

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# Erosion Control Breakout

**Design Changes**

**Surface Area Requirement**

$SA = 0.01 \times \text{Peak Runoff Rate}$

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**Design Changes**

**Surface Area Requirement**

The 1800 Cft/Dist Acre Way

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**Design Changes**

**Surface Area Requirement**

The 1800 Cft/Dist Acre Way

2 Acres Disturbed

$2 \times 1800 \text{ CFT} = 3600 \text{ CFT}$

3600 CFT Required

6 Basins

$20 \times 10 \times 3 \text{ ft}$

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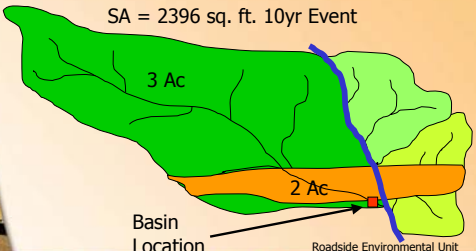
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# Erosion Control Breakout

**Design Changes**

**Surface Area Requirement**

$SA = 0.01 \times \text{Peak Runoff Rate}$   
 $SA = 2396 \text{ sq. ft. } 10\text{yr Event}$



3 Ac

2 Ac

Basin Location

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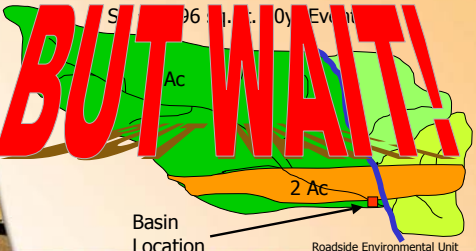
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**Design Changes**

**Surface Area Requirement**

$SA = 0.01 \times \text{Peak Runoff Rate}$   
 $SA = 2396 \text{ sq. ft. } 10\text{yr Event}$

**BUT WAIT!**



3 Ac

2 Ac

Basin Location

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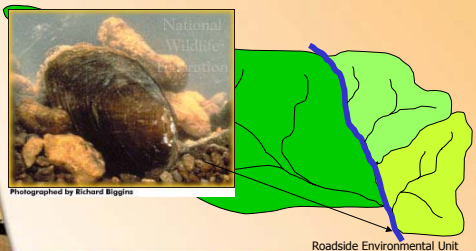
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**Design Changes**

**Dwarf Wedge Mussel**



3 Ac

2 Ac

Basin Location

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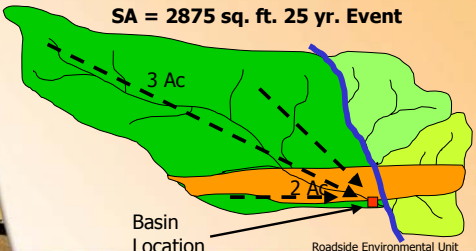
# Erosion Control Breakout

**Design Changes**

**Surface Area Requirement**

$SA = 0.01 \times \text{Peak Runoff Rate}$

**SA = 2875 sq. ft. 25 yr. Event**



3 Ac

2 Ac

Basin Location

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**Design Changes**

**Surface Area Requirement**

$SA = 0.01 \times \text{Peak Runoff Rate}$

**SA = 2875 sq. ft. 25 yr. Event**

**Basin Size = 95 x 30 x 2 ft**

**Volume = 5750 cft**

**Compared to**

**3600 cft**

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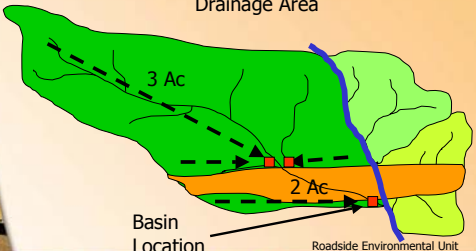
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**Design Changes**

**Surface Area Requirement**

Surface Area is Dependent on Drainage Area



3 Ac

2 Ac

Basin Location

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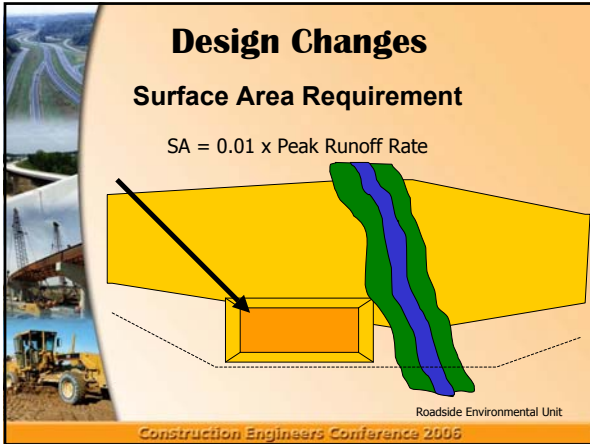
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# Erosion Control Breakout



**Design Changes**

**Surface Area Requirement**

$SA = 0.01 \times \text{Peak Runoff Rate}$

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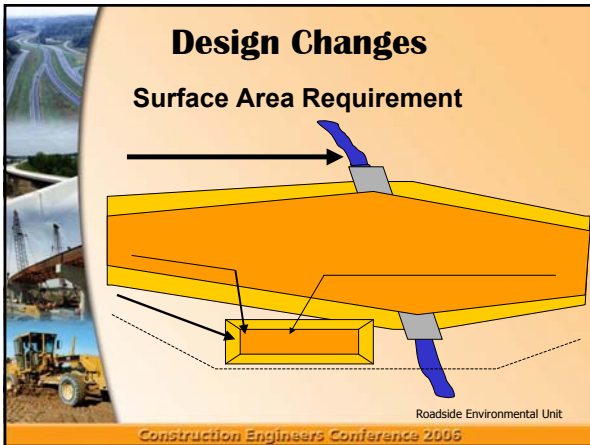
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**Design Changes**

**Surface Area Requirement**

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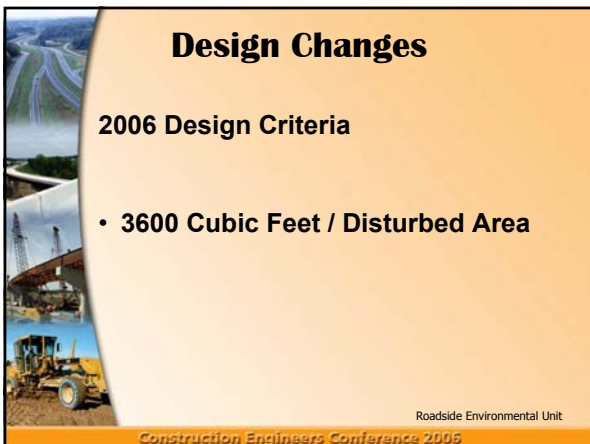
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**Design Changes**

**2006 Design Criteria**

- 3600 Cubic Feet / Disturbed Area

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# Erosion Control Breakout



## Design Changes

2006 Design Criteria

Stone Outlet Device  
3600 Cubic Feet / Disturbed  
Area

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## Design Changes

2006 Design Criteria

Skimmer Outlet Device  
1800 Cubic Feet / Disturbed  
Area

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## Design Changes

### 2006 Design Criteria

Improve the technology to make the erosion and sedimentation control devices more efficient or ...

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# Erosion Control Breakout



## Specification Changes

Section 1675 Response for Erosion Control

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## Specification Changes

Section 1675 Response for Erosion Control

*Response for Erosion Control* will be measured by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites and satisfactorily completes an erosion control action described in Form 1675.

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## Specification Changes

Section 1675 Response for Erosion Control

- Seeding and Mulching
- Temporary Seeding and Mulching
- Temporary Mulching
- Fertilizer Topdressing
- Repair Seeding
- Supplemental Seeding
- Silt Fence Installation or Repair
- Installation of Matting for Erosion Control

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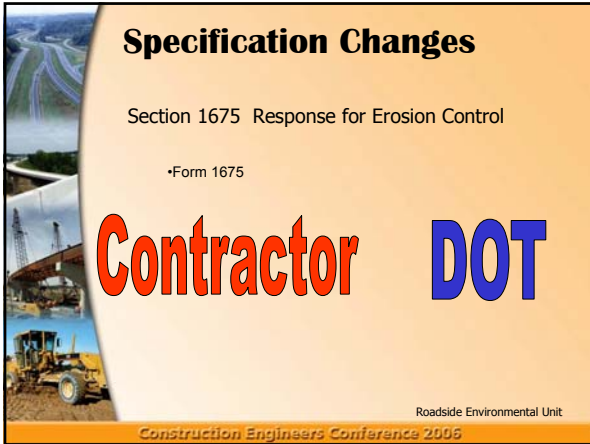
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# Erosion Control Breakout



**Specification Changes**

Section 1675 Response for Erosion Control

•Form 1675

**Contractor DOT**

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**Stormwater Monitoring-  
NCG010000 Reporting**

- Web-based Rainfall Alert and Monitoring Tool

Multi-Sensor Precipitation Estimates (MPE)

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# Erosion Control Breakout



## Stormwater Inspection

- NPDES Permit
  - NCG010000 - General Permit to Discharge Stormwater
  - General Requirements:
    - Inspect Project for Pollution Sources
    - Implement Reduction Measures
    - Rainfall Monitoring Requirements

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## Multi-sensor Precipitation Estimates (MPE)

- Web-based Rainfall Alert and Monitoring Tool
- Developed by State Climate Office of North Carolina for NCDOT



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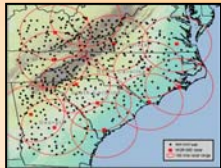
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## Multi-sensor Precipitation Estimates (MPE)

- Provides Precipitation Estimates NWS Doppler Radar
- Combines Radar Estimates Are Calibrated with Ground-Surface Gage Networks



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# Erosion Control Breakout



## Multi-sensor Precipitation Estimates (MPE)

- Error Rate - 0.023 Inches Over A 24 Hour Period
- MPE Compares Well with Independent Daily Precipitation Gage Network Over NC
- Most Accurate Local-Scale Hourly Precipitation Estimates Available



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## Multi-sensor Precipitation Estimates (MPE)

- Efficiencies Gained:
  - Email Notification
  - Can Identify Multiple Stations on Large Projects
  - Record Keeping
  - Weather Related Delay Claims
  - Rainfall Data for Remote Locations

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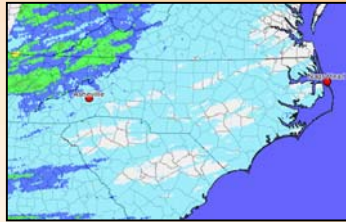
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## Multi-sensor Precipitation Estimates (MPE)

- View Website Application



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# Erosion Control Breakout

## Email Notification

**Subject:** ALERT for Nags Head - 0.43 inches within 24 hours  
**Date:** Thu, 23 Feb 2006 19:42:51 -0500  
**From:** "State Climate Office of NC" <cronos@cumulus.meas.ncsu.edu>  
**To:** kpace@dot.state.nc.us

This is an automatically generated precipitation alert message from the State Climate Office of North Carolina. This alert is for...

**PROJECT:** NC - Regional  
**SITE:** Nags Head  
**LOCATION:** 35.95722, -75.62444  
**THRESHOLD:** 0.25 inches within 24 hours  
**ALERT:** 0.43 inches during the previous 24 hours ending at 7pm, Feb 23.

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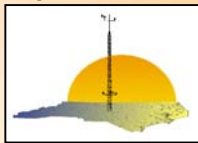
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## Website Application

- Application Capacity:  
-Approximately 500 Users
- How Is Access by Contractors and DOT personnel controlled?



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## Questions/Comments



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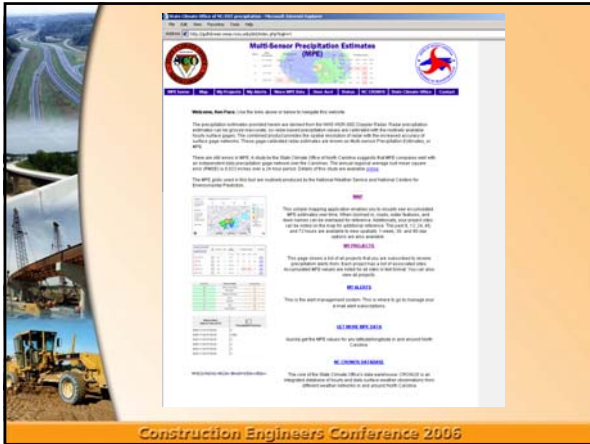
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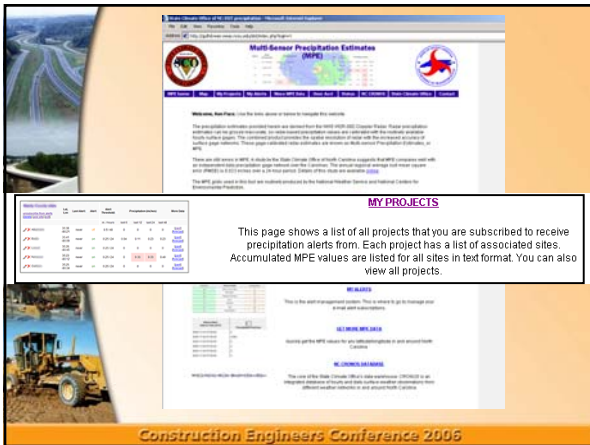
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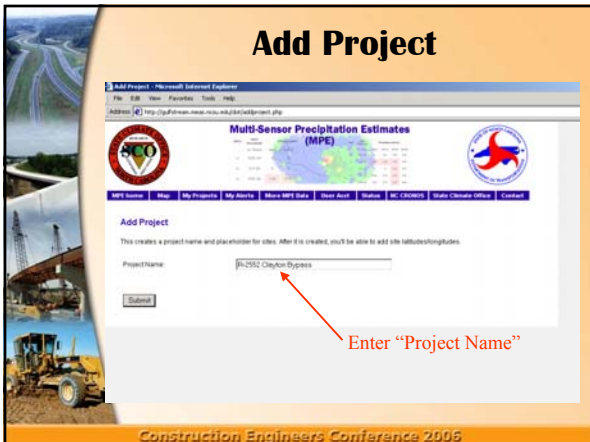
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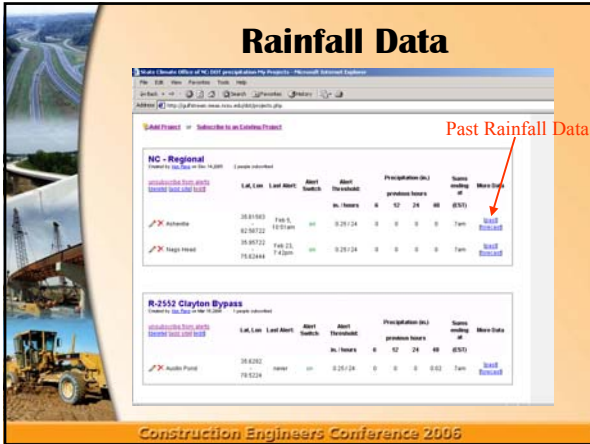
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Page 28

# Erosion Control Breakout




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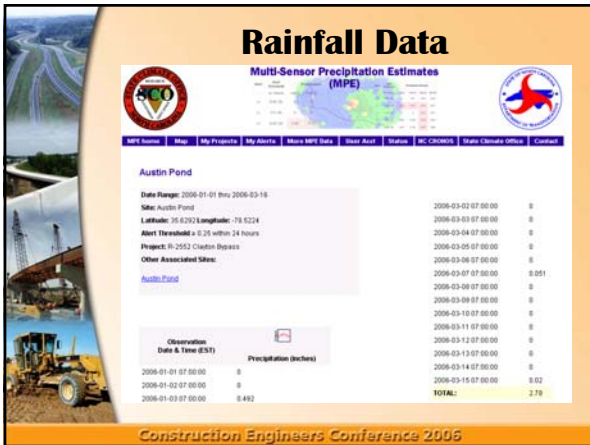
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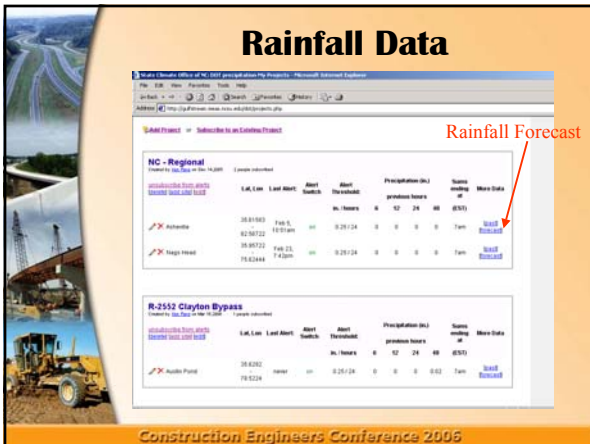
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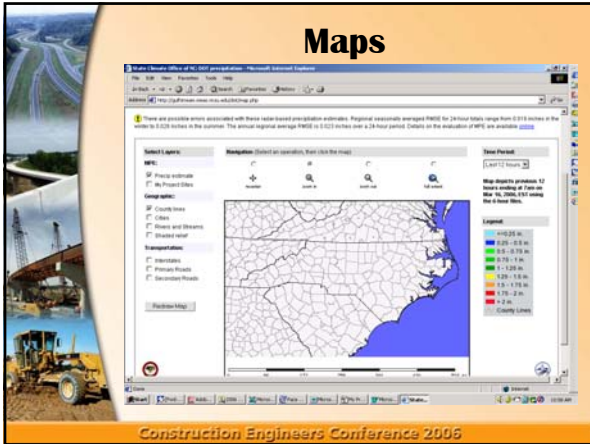
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# Erosion Control Breakout



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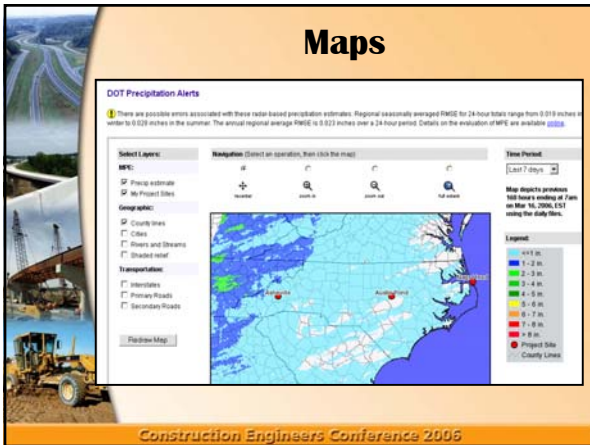
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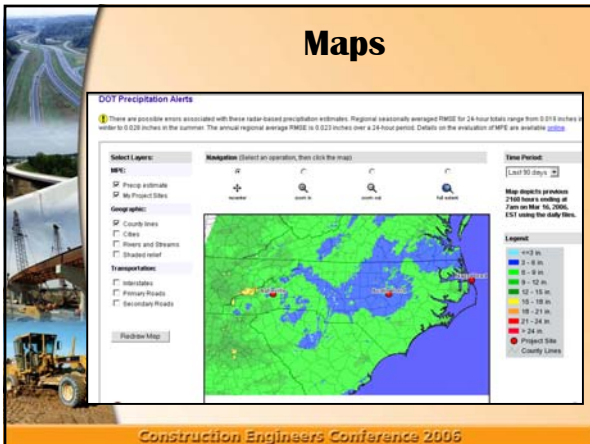
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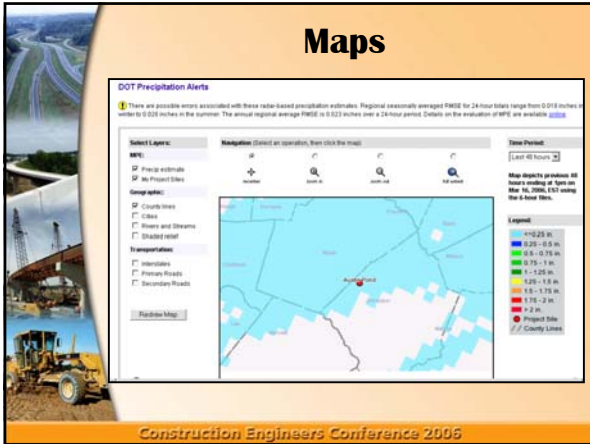
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# Erosion Control Breakout



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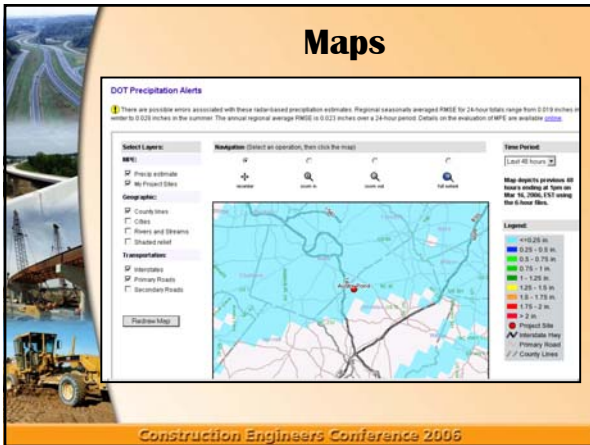
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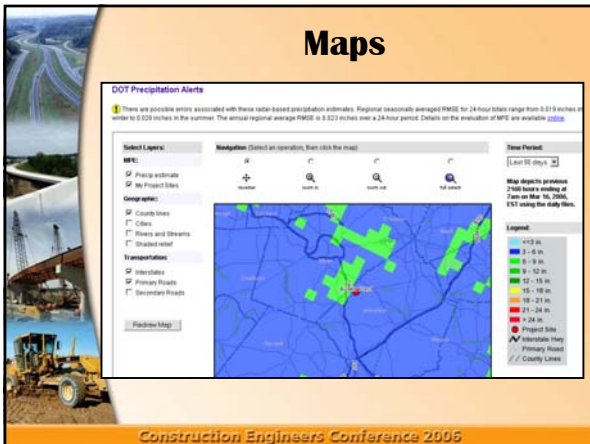
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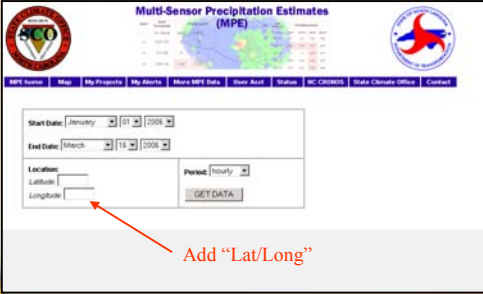
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## 2006 Construction Engineers Conference

# Erosion Control Breakout



## Get More Data



Construction Engineers Conference 2006

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## Website Issues

- Application Capacity - Approximately 500 Users
- How Is Access by Contractors and DOT personnel controlled?

Construction Engineers Conference 2006

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## Questions/Comments



Construction Engineers Conference 2006

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